EXHIBIT II

**The School Board of Broward County, Florida**

# Research Report

### The Cognitive Abilities Test™ (CogAT®) 2018

Each year Broward County Public Schools (BCPS) administers the Cognitive Abilities Test™ (CogAT)® to all second grade students.  The CogAT® is used as a universal screener to identify students who need gifted services, to detect differences between ability and performance, and to provide valuable information about students' level of cognitive development in order to inform differentiated instruction.

The CogAT® measures students' abstract reasoning skills, or general reasoning ability[1], in three domains: verbal, quantitative, and nonverbal. This ability underpins academic success (Lohman & Hagen, 2003). Thus, students who are in a supportive learning environment and who are free from a disability typically have standardized test scores that are predicted by their CogAT® scores. Dramatic deviations between these two scores indicate the need for further investigation to see if the student needs additional support.

The CogAT® has been used as a universal screener to identify gifted students, particularly from under-represented populations, in BCPS since 2011.  In 2015, BCPS began using this assessment to help principals and guidance counselors make decisions about classroom placement and to help teachers differentiate instruction to better meet the specific needs of students based on their level of cognitive development. Profile scores for students who took all three batteries of the CogAT® were posted in the DWH reports folder in the data warehouse for both the 2015 and 2016 administrations of the CogAT®. Training on how to use CogAT® scores to differentiate instruction was also given in January and February of 2016 to the principal and one-third grade teacher from each District-run elementary school.

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[1] For a more detailed description of the CogAT®, see the BCPS Research Report The Cognitive Abilities Test™ (CogAT®): Screening for Giftedness, Predicting Achievement, and Informing Differentiated Instruction, released on October 16, 2015 which is available at https://www.browardschools.com/cms/lib/FL01803656/Centricity/Domain/13537/releases/reports/BCPS-CogAT-Assessment-Report-2015.pdf.

This report begins by reviewing the data from the 2018 administration of the CogAT® as a gifted screener, then looks at the correlation between the 2018 administration of the CogAT® and the 2019 Florida Standards Assessment (FSA) scores. Next, patterns in scores are illustrated with deviant CogAT®/FSA scores identified. Finally, a distribution of scores by group is provided.

## I. GIFTEDNESS

Gifted students have a different way of processing information, and benefit from both more challenging coursework and a curriculum that is based on independent and discovery learning. Gifted children can easily become bored in a typical classroom, which can lead to both behavioral and academic problems (Baum, Renzulli, & Herbert, 1995). Under-challenging students also leads to a lack of persistence; gifted students come to expect that all work will be easy and when faced with a difficult problem they tend to get frustrated and give up (Lohman & Hagen, 2003). Identification of gifted students is therefore critical in order to optimize outcomes for these students.

The Florida Department of Education (FDOE) mandates that all districts have a plan in place to identify gifted students from under-represented student populations. BCPS has administered the CogAT® for this purpose since 2011. Students who take the CogAT® are eligible for further screening for giftedness through either Plan A or Plan B (see Method below for specific criteria). Plan A gifted screening criteria seek to identify students with an intelligence quotient (IQ) of 130 or higher. Plan B gifted screening criteria are designed to identify students from under-represented populations who have an IQ of 115 or higher.

In 2018, of the 18,207[2] second grade students 16,368 (89.9%) took the CogAT®, with 13,466 (74.0%) taking all three batteries. Results from this administration of the CogAT® as a gifted screener for Plan A and Plan B are presented below.

## METHOD

The CogAT® form 6, Level A was administered District-wide to second grade students in April 2018. Level A is geared towards third graders. However, BCPS students take the exam at the end of second grade. Testing at a higher level provides a finer discrimination among the top scoring students which is ideal for the purposes of screening for gifted students. All traditional schools and some charter schools participated in the exam. All schools that participated are included in this analysis. The 2018 CogAT® data were pulled from the District's data warehouse in January 2020.

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[2] This number includes all grade 2 students who were enrolled in a BCPS District-run or CogAT® participating charter school during the CogAT® test administration.

**Means**. Standard Age Scores (SAS) were used to calculate means for each battery overall as well as by student sub-population. The SAS are normalized standard scale scores that compare students to other same-age students (matched to the closest month) from a national sample that took the CogAT® in 2005. Nationally, the SAS have a mean of 100 and standard deviation of 16.

**Students Meeting Screening Criteria for Gifted.** Age percentile rank scores are used to determine inclusion in the Plan A and Plan B screening groups. Age percentile rank scores are based on the 2005 national normative sample group provided by Riverside Publishing, the publisher of the CogAT®. Students scoring in the 50th percentile are considered average. Plan A includes students with a composite score for the three batteries (verbal, quantitative, and nonverbal) of the CogAT® in the 97th percentile or higher. Plan B, which is geared towards under-represented populations, includes students with a composite score from two of the three batteries (quantitative and nonverbal) in the 81st percentile or higher. In order to qualify for Plan B screening, students must also have limited English proficiency (ELL2[3]) or qualify to receive free or reduced-price lunch (FRL).

<center>RESULTS</center>

**Participation**. In school year 2018 there were 13,466 students (74.0% of all second-grade students; 74.2% of District-run school students and 72.4% of charter school students[4]) had complete scores for all three batteries of the CogAT®. A total of 16,368 students (89.9% of all second-grade students) took at least some portion of the test, but either did not take all three batteries, or attempted to but did not complete enough answers to receive a score.

**Mean Scores**. Means for the verbal and quantitative batteries (Figures 1 – 4) are somewhat lower for this cohort in Broward County than for the 2005 national sample to which it is compared (7.7 lower mean for verbal and 5.4 lower mean for quantitative). Scores for the nonverbal battery (*M=100*) are comparable to the national sample. Students' performance on the Nonverbal Battery is least impacted by growing up in poverty or in a home that does not speak English. Thus, these results are consistent with the fact that BCPS has a larger percentage of FRL[5] and ELL[6] students than are found nationally.

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[3] ELL2 includes students currently receiving special services as well as those in the two-year follow-up period. ELL includes only students currently receiving special services. BCPS typically reports data just for ELL. However, since different criteria are used to determine eligibility for Plan B, ELL2 data are reported here.

[4] These numbers are calculated using all grade 2 students who were enrolled in a BCPS District-run or CogAT® participating charter school during the CogAT® test administration. In 2017-18, 2nd grade enrollment was 18,207 (16,089 District-run and 2,118 charter).

[5] The percent of FRL students nationally in 2016-17 was 52% compared to 70% of BCPS students taking the CogAT® in 2017-18 (National Center for Education Statistics, 2018a).

[6] The percent of ELL students nationally in 2016-17 was 9.6% compared to 23% of BCPS students taking the CogAT® in 2017-18 (National Center for Education Statistics, 2018b).

**Verbal Reasoning 2018**

Scores for the 16,284 students that took the verbal battery were distributed normally around the mean of 92.4 with a standard deviation of 14.0 (Figure 1). Mean scores by student sub-population are presented in Figure 2.
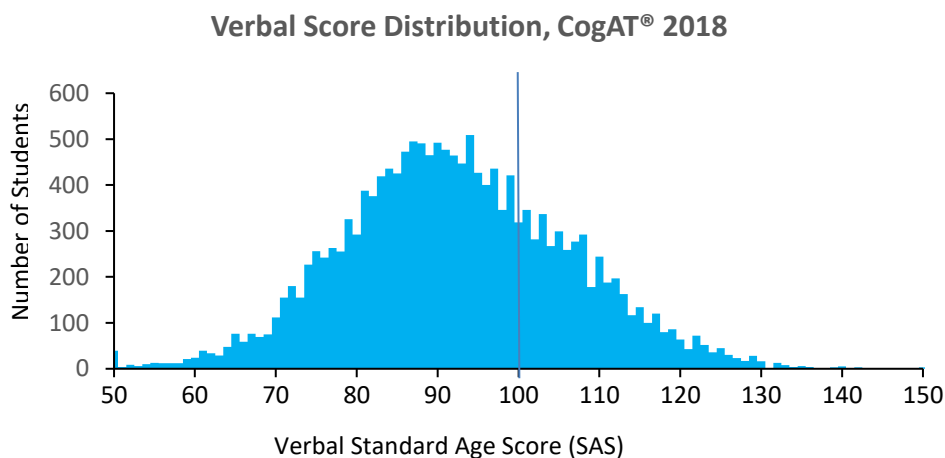
**Verbal Score Distribution, CogAT® 2018**



*Figure 1.* Distribution of verbal battery SAS scores for second grade students taking the CogAT® in Spring 2018. *N* = 16,284, *Mean* = 92.4, *SD* = 14.0. The blue line indicates the national mean score of 100.

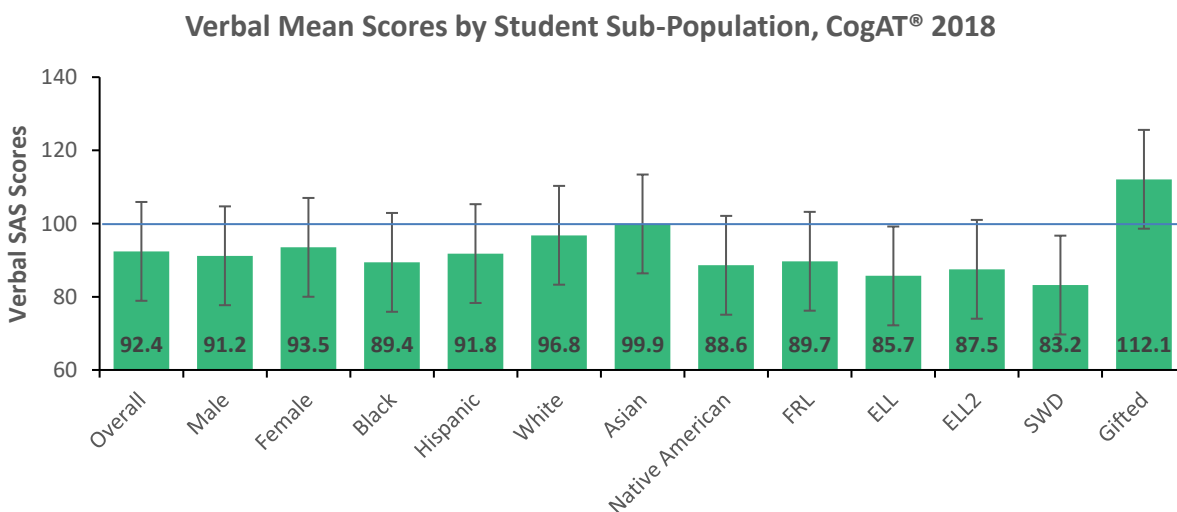**Verbal Mean Scores by Student Sub-Population, CogAT® 2018**



*Figure 2.* Mean Verbal Battery SAS scores by student sub-population for the 2018 administration of the CogAT® to second grade students. The blue line indicates the national mean score of 100. Student population sizes are as follows: Overall *N*=16,284, Male *n*=8,258, Female *n*=8,026, Black *n*=6,026, Hispanic *n*=5,828, White *n*=3,244, Asian *n*=649, Native American *n*=42, FRL *n*=11,459, ELL *n*=3,665, ELL2 *n*=4,321, SWD *n*=2,079, Gifted *n*=539.

## Quantitative Reasoning 2018

Scores for the 14,593 students who took the quantitative battery were distributed normally around the mean of 94.7 with a standard deviation of 11.8 (Figure 3). Mean scores by student sub-population are presented in Figure 4.
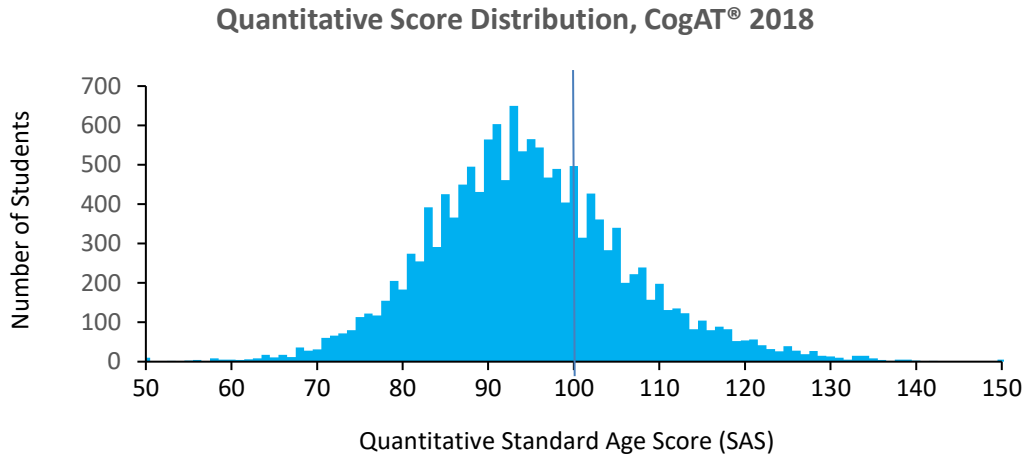
**Quantitative Score Distribution, CogAT® 2018**



*Figure 3.* Distribution of quantitative battery SAS scores for second grade students taking the CogAT® in Spring 2018. *N* = 14,593, *Mean* = 94.7, *SD* = 11.8. The blue line indicates the national mean score of 100.

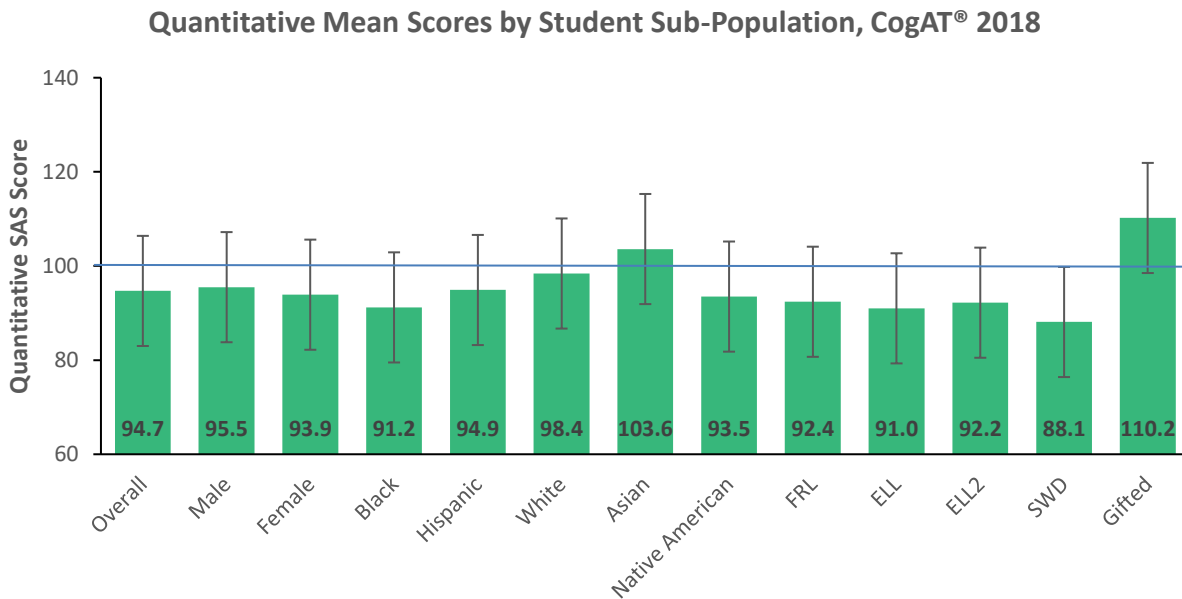**Quantitative Mean Scores by Student Sub-Population, CogAT® 2018**



*Figure 4.* Mean Quantitative Battery SAS scores by student sub-population for the 2018 administration of the CogAT® to second grade students. The blue line indicates the national mean score of 100. Student population sizes are as follows: Overall *N*=14,593; Male *n*=7,423; Female *n*=7,170; Black *n*=5,286; Hispanic *n*=5,220; White *n*=2,990; Asian *n*=610; Native American *n*=41, FRL *n*=10,124; ELL *n*=3,263; ELL2 *n*=3,873; SWD *n*=1,778; Gifted *n*=522.

**Nonverbal Reasoning 2018**

Scores for the 14,514 students who took the nonverbal reasoning battery were distributed normally around the mean of 98.8 with a standard deviation of 14.4 (Figure 5). Mean scores by student sub-populations are presented in Figure 6.
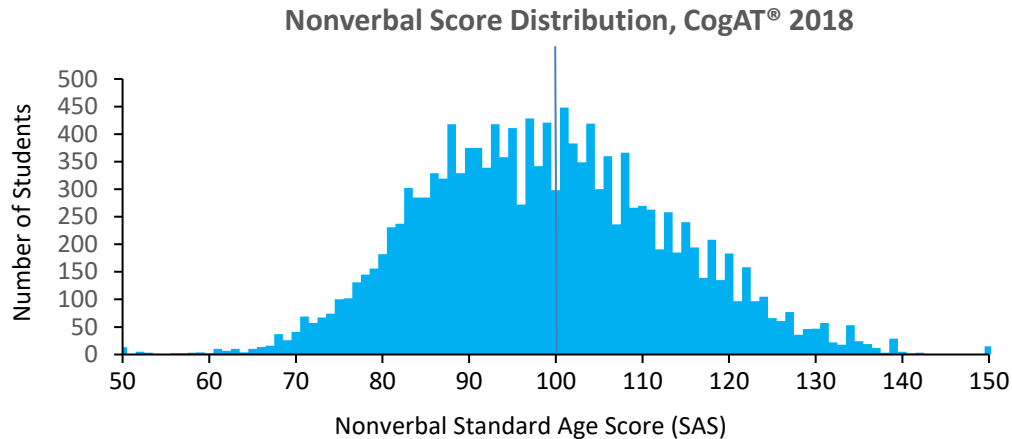


*Figure 5.* Distribution of nonverbal battery SAS scores for second grade students taking the CogAT® in Spring 2018. *N* = 14,514 *Mean* = 98.8, *SD* = 14.4. The blue line indicates the national mean score of 100.
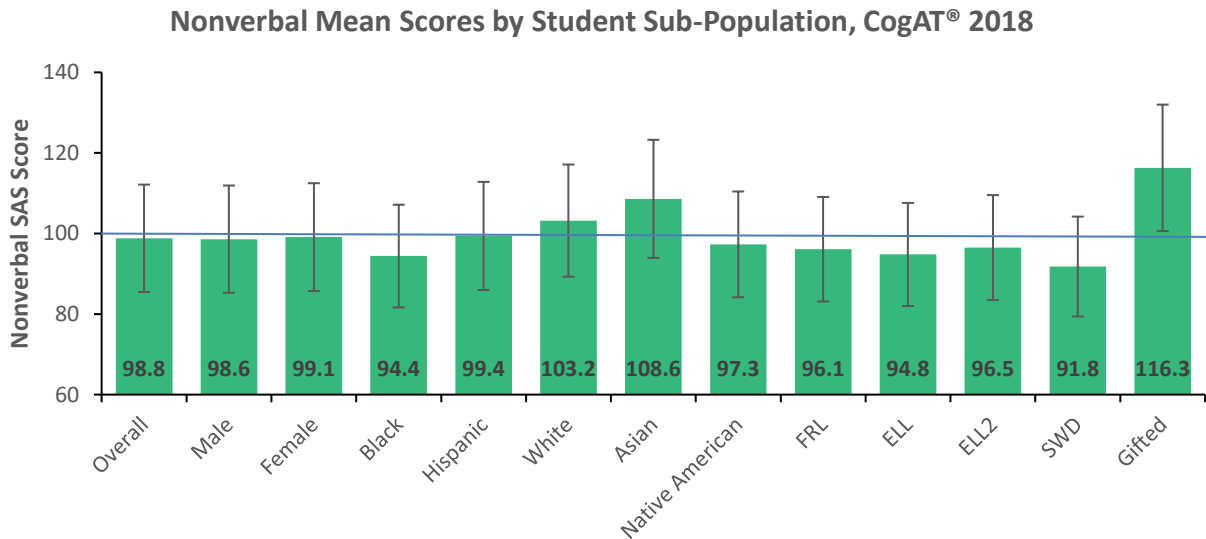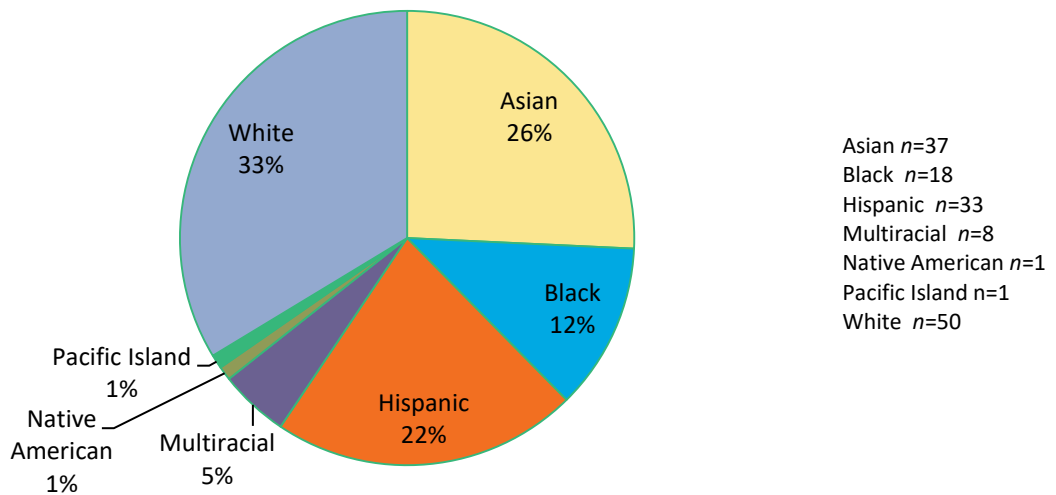


*Figure 6.* Mean Nonverbal Battery SAS scores by student sub-population for the 2018 administration of the CogAT® to second grade students. The blue line indicates the national mean score of 100. Student population sizes are as follows: Overall *N*=14,514, Male *n*=7,240, Female *n*=7,274, Black *n*=5,234, Hispanic *n*=5,180, White *n*=3,010, Asian *n*=603, Native American *n*=40, FRL *n*=10,041, ELL *n*=3,183, ELL2 *n*=3,803, SWD *n*=1,747 , Gifted *n*=524.
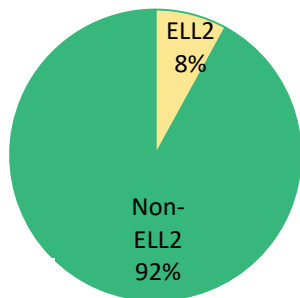
**Gifted Screening - Plan A**

Of the 13,466 students who took all three batteries of the CogAT®, 148 (1.1%) achieved a composite score of the verbal, quantitative, and nonverbal batteries (VQN) that had an age percentile ranking of 97 or higher. Thirty-four (23.0%) of these students had previously been identified as gifted students. Thus, a total of 114 Plan A students were identified for further screening for gifted eligibility through the 2018 administration of the CogAT®. Figure 7 shows the distribution of students meeting Plan A scoring criteria by racial/ethnic group, ELL2, and FRL. These figures include all 148 students regardless of whether they had been previously identified as gifted.

**Students Meeting Plan A Criteria for Gifted
by Racial/Ethnic Group, 2018**



Asian *n*=37
Black *n*=18
Hispanic *n*=33
Multiracial *n*=8
Native American *n*=1
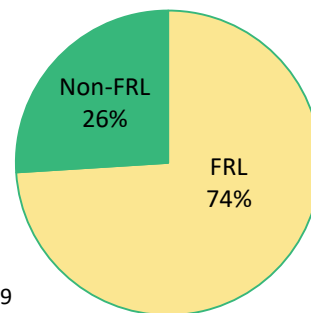Pacific Island n=1
White *n*=50

**Students Meeting Plan A Criteria
by English Proficiency**



ELL2 *n* = 12
Non-ELL2 *n* = 136

**Students Meeting Plan A Criteria
by Free/Reduced-Price Lunch Eligibility**



FRL *n* = 109
Non-FRL *n* = 39

*Figure 7.* Students meeting criteria for Plan A by student sub-population in school year 2017-2018.

**Gifted Screening - Plan B**

Plan B students need to achieve a composite quantitative and nonverbal (QN) score in the 81$^{st}$ percentile or higher, and either have limited English proficiency or qualify for free or reduced-price lunch. The score component of this criteria was achieved by 1,397 (10.3%) of the 13,516 students who took both the quantitative and non-verbal batteries. Of those, 655 also met the ELL or FRL requirements. Thirty-nine (6.0%) of these students had previously been identified as gifted students. Thus, the 2018 administration of the CogAT® identified 616 Plan B students to be screened for gifted program eligibility. Figure 8 illustrates the students who met Plan B criteria by sub-population, including those already identified as gifted.

**Students Meeting Plan B Criteria
by Racial/Ethnic Group**

Asian  *n*=87
Black  *n* =171
Hispanic  *n*=248
Multiracial  *n*=21
Native American *n*=1
Pacific Island n=2
White  *n*=125

Black 26%
Asian 13%
White 19%
Pacific Island 0%
Native American 0%
Multiracial 3%
Hispanic 39%

**Students Meeting Plan B Criteria
by English Proficiency**

ELL2 34%
Non-ELL2 66%

ELL2 *n* = 220
Non-ELL2 *n* = 435

**Students Meeting Plan B Criteria
by Free/Reduced-Price Lunch Eligibility**

Non-FRL 15%
FRL 85%
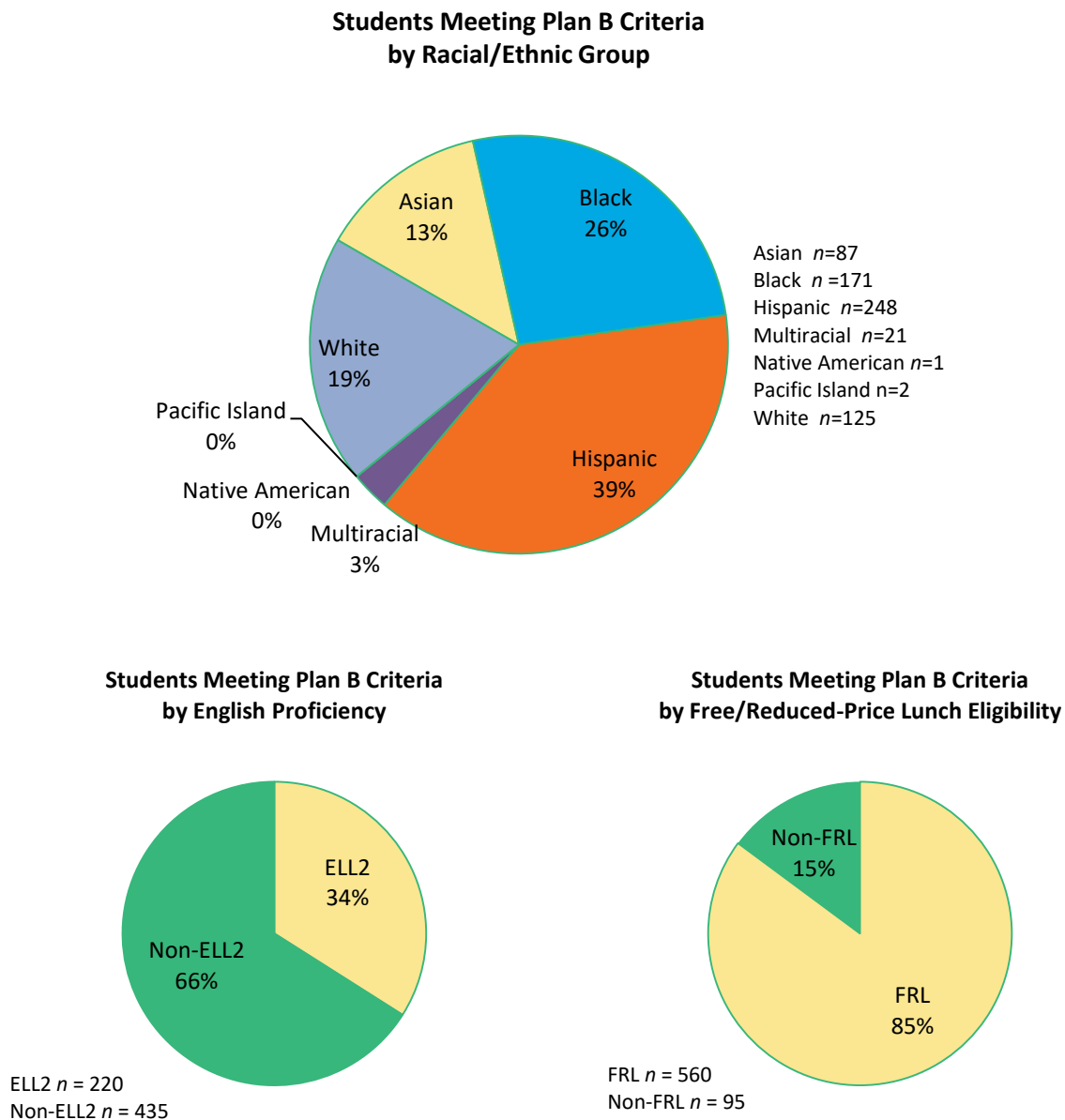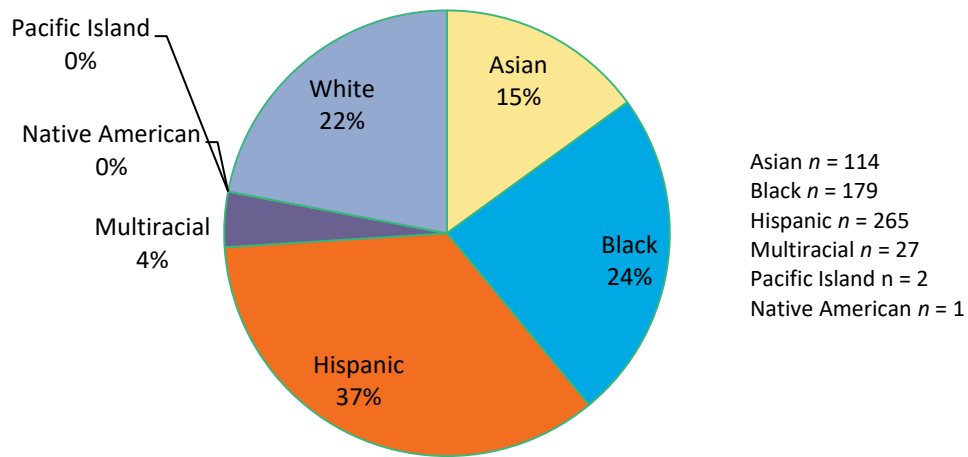
FRL *n* = 560
Non-FRL *n* = 95

*Figure 8*. Students meeting criteria for Plan B by sub-population in school year 2017-18.
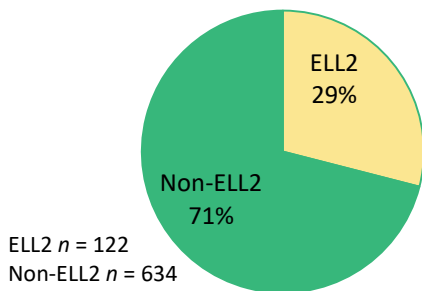
## Gifted Screening – Combined

Combined, 756[7] students met criteria for either Plan A or Plan B and were thus identified as eligible for further screening for gifted. Of those, 65 were already classified as gifted, leaving 691 students to be screened. As of the 2020 school year 392 (56.7%) of the 691 students have been identified as gifted students  Figure 9 illustrates the students who met Plan A or B criteria combined, by sub-population, including those already identified as gifted.  Figure 10 shows the percentage of students meeting gifted screening criteria by student sub-population.

**Students Meeting Both Plan A or Plan B Criteria
by Racial/Ethnic Group**



Asian *n* = 114
Black *n* = 179
Hispanic *n* = 265
Multiracial *n* = 27
Pacific Island n = 2
Native American *n* = 1

**Students Meeting Plan A or Plan B
Criteria by English Proficiency**



ELL2 *n* = 122
Non-ELL2 *n* = 634

**Students Meeting Plan A or Plan B
Criteria by Free/Reduced-Price
Lunch Eligibility**
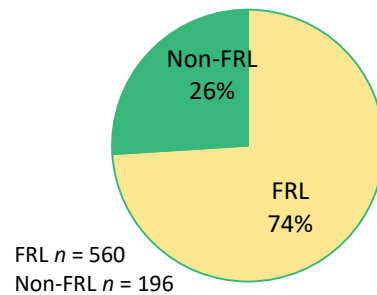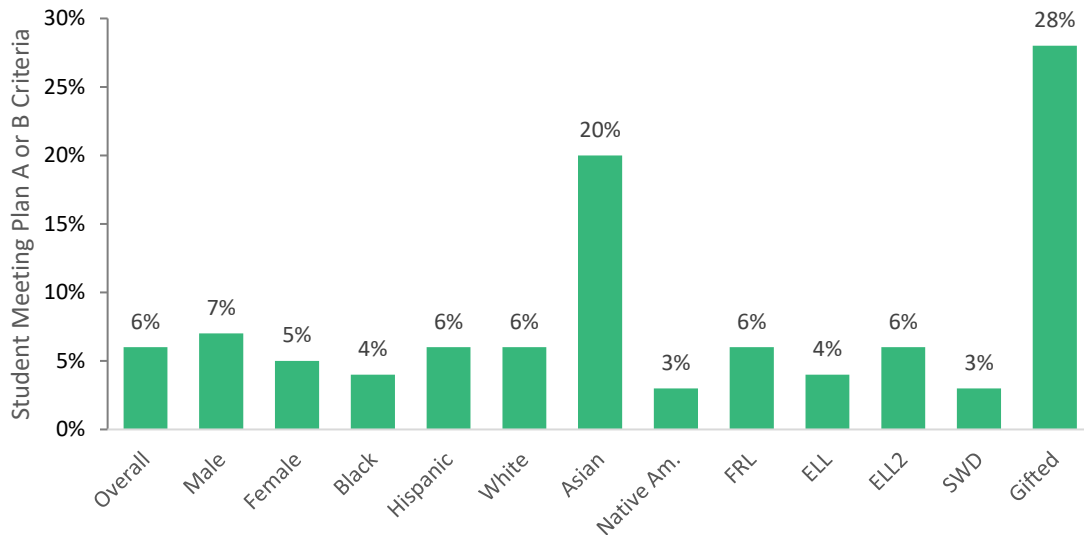


FRL *n* = 560
Non-FRL *n* = 196

*Figure 9.* Students meeting criteria for Plan A or Plan B by student sub-population in school year 2017-18.

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[7] The total number of students identified is lower than adding Plan A and Plan B together because 47 students met criteria for both Plan A and Plan B.

**Percent of Students Meeting Plan A or Plan B Criteria on the CogAT®
by Sub-Population**



*Figure 10*. Percentage of students meeting Plan A or Plan B criteria on the 2018 CogAT® by student sub-population. This figure shows the percentage of a specific sub-population that met gifted screening criteria. For example, of all the students who took enough batteries of the CogAT® to have a composite score, 5% met criteria to be screened for the gifted program.

## Performance by School

One-hundred fifty-eight schools administered the CogAT® in 2018 and had students with both $SAS_Q$ and $SAS_N$ scores (142 District-run and 16 charter). Of those 156 had scores for ten or more students (140 District-run and 16 charter). Performance by school data is calculated using the 156 schools that had CogAT® scores for at least 10 students.

The percentage of students that met Plan A criteria (*M* = .01, *SD* = .018) ranged between 0% and 18% for each school. The percentage of students who met Plan B criteria (*M* = .03, *SD* = .04) ranged between 0% and 29% for each school. The percentage of students that met either Plan A or Plan B criteria (*M* = .04, *SD* = .047) ranged between 0% and 41%. Fifty-six schools (21 District-run and 35 charter) did not have any students successfully screen for Plan A or Plan B. See Appendix A for number and percent of students meeting Plan A and Plan B criteria as well as mean $SAS_{VQN}$ and $SAS_{QN}$ scores by school[8].

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[8] Means are not presented for schools with less than 10 students participating in the exam to respect the privacy of individual students and avoid misinterpretation of results.

## II. Predicting Achievement

The CogAT® and standardized tests such as the Florida Standards Assessment (FSA) measure two different aspects of cognitive development. The CogAT® measures the general abstract reasoning skills that serve as the foundation for the student's ability to complete a variety of tasks such as learning and remembering information, detecting relationships, and using previous experience to solve novel problems. These abilities are also known as fluid reasoning abilities. Standardized achievement tests measure knowledge and skills explicitly taught at school, also known as crystallized abilities. Together, measures of fluid and crystallized abilities provide a more complete picture of cognitive development than either one alone (Cattell, 1971). This can be compared to measuring physical development; knowing someone's height and weight provides a more complete picture than knowing just weight alone (Lohman & Hagen, 2003).

General reasoning ability underpins academic achievement. Thus, CogAT® scores are well correlated with standardized test scores. Dramatic deviations between CogAT® scores and FSA scores can help to identify students in need of extra support. These students exhibit an imbalance in cognitive development which can be the result of a number of factors.

Students' whose fluid ability is greater than their crystalized achievement, as indicated by scoring substantially lower on the FSA than is predicted by their CogAT® score, demonstrate that they are better at solving novel problems than at academic tasks. There are several possible explanations for this imbalance. These students may not have the motivation to apply themselves in school ("underachievers"), may not have appropriate opportunities to learn in school, or may have a physical (i.e. vision or hearing) or learning disability (Lohman & Hagen, 2003).

Students' whose crystalized achievement is greater than their fluid ability, as indicated by scoring substantially higher on the FSA than is predicted by their CogAT® score, demonstrate that they are learning in a contextually bound manner and are having difficulty transferring what they learn in school to other situations. This could indicate that the students have worked exceptionally hard to learn their schoolwork ("overachievers"), or it could mean that something about the way they learn or the way they are taught at school is inhibiting their ability to transfer what they have learned (Lohman & Hagen, 2003).

This section contains two analyses. First, correlations are shown between the CogAT® scores and standardized test scores. Next, deviations between CogAT® scores and predicted standardized test scores are shown. All CogAT® scores represent the Spring 2018 administration of the CogAT® form 6, Level A to second grade students. All students who took both the CogAT® in 2018 and the FSA in 2019 are included in the analyses.

**Correlations.** Correlations between the English Language Arts (ELA) and Math subtests of the FSA and the various standard age scores (SAS) from the CogAT® were calculated. $SAS_V$ is the verbal battery, $SAS_Q$ is the quantitative battery, $SAS_N$ is the nonverbal battery, $SAS_{VQN}$ is the composite of all three batteries, and is used to determine Plan A eligibility. $SAS_{QN}$ is a composite of the quantitative and nonverbal batteries used to determine Plan B eligibility. SAS scores range between 50 and 150. Students who had a SAS composite score greater than or equal to 50 were included in the analysis.

**Deviations**. Measures of ELA and math were obtained using results from the District-wide administration of the FSA for ELA and Math to third grade students in Spring 2019. FSA scores were linked to CogAT® scores, and only students who had valid CogAT® and FSA scores were retained for the analysis. Deviations from predicted scores were calculated using correlations between each CogAT® $SAS_{VQN}$ score and each FSA Achievement Level. Cut points for CogAT® scores were created at the score in which most students at that score achieved a particular level on the FSA.

### 2019 RESULTS

Correlations between students' 2015 second grade CogAT® score and 2016 third grade FSA score for ELA and Math were all moderate to strong, ranging from .57 to .71. The $SAS_{VQN}$ exhibited the strongest correlation.

*Table 1.* Correlations between 2018 second grade CogAT® scores and 2019 third grade FSA scores.

|  | **SAS$_V$** | **SAS$_Q$** | **SAS$_N$** | **SAS$_{VQN}$** | **SAS$_{QN}$** |
|---|---|---|---|---|---|
| FSA 2019 ELA | .67 | .58 | .57 | .68 | .62 |
| FSA 2019 Mathematics | .61 | .67 | .63 | .71 | .70 |

*Note: All correlations are significant at the 0.01 level.*

**Deviations from Predicted Scores 2019**

This section presents typical and deviant scoring patterns between the 2018 second grade CogAT® SAS$_{VQN}$ scores and the 2019 third grade FSA ELA and math achievement levels (Tables 2 and 3). The green boxes indicate the scoring pattern observed in the greatest percent of students. The top number represents the number of students who had this pattern of score and the bottom number indicates the percent of students within that CogAT® score range who scored at that achievement level. Students who scored at least two levels above or below the level at which the majority of the students scored were identified as having deviant scores. The white boxes indicate the students' FSA achievement is one level above or below predicted achievement. The blue and yellow boxes indicate substantial differences between expected and actual FSA levels based on CogAT® scores. Blue boxes indicate students are performing better on the FSA than expected, and yellow boxes indicate they are performing worse than expected. The deviant scores suggest a potential imbalance in cognitive development and indicate the need to explore the reason for such differences in scores for these students.

*Table 2*. 2018 second grade CogAT® SAS$_V$ Scores compared to 2019 third grade FSA ELA scores.

| 2018 CogAT® Score Range | 2019 Third Grade FSA ELA | | | | | Total |
| --- | --- | --- | --- | --- | --- | --- |
| | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| 50-84 | 976 44.9% | 708 32.6% | 387 17.8% | 97 4.5% | 4 0.2% | 2,172 |
| 85-90 | 388 19.7% | 671 34.1% | 669 34.0% | 224 11.2% | 17 0.9% | 1,969 |
| 91-104 | 218 4.4% | 905 18.2% | 2,014 40.4% | 1,528 30.7% | 320 6.4% | 4,985 |
| 105-117 | 10 0.4% | 74 3.3% | 597 22.1% | 1,104 49.1% | 564 25.1% | 2,249 |
| 118-150 | 0 0.0% | 2 0.3% | 43 6.2% | 252 36.4% | 395 57.1% | 692 |
| Total by FSA Level | 1,592 | 2,360 | 3,610 | 3,205 | 1,300 | 12,067 |
| Total Under-performing | | | | | n = 347 | 2.9% |
| Total Over-performing | | | | | n = 1,026 | 8.5% |

*Note: Green = congruent scores, white = one level above or below expected scores, yellow = lower than expected performance, blue = higher than expected performance. The top number in each box is the number of students with that score combination.*

*Table 3*. 2018 second grade CogAT® SAS$_{VQN}$ Scores compared to 2019 third grade FSA math scores.

| 2018 CogAT® Score Range | 2019 Third Grade FSA Math | | | | | Total |
| --- | --- | --- | --- | --- | --- | --- |
| | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | |
| 50 - 85 | 1,048 42.9% | 681 27.9% | 548 22.4% | 153 6.3% | 11 0.5% | 2,441 |
| 86 -86 | 60 19.4% | 102 33.0% | 115 37.2% | 29 9.4% | 3 1.0% | 309 |
| 87 - 101 | 332 6.2% | 922 17.1% | 2,153 40.0% | 1,636 30.4% | 335 6.2% | 5,378 |
| 102 - 114 | 9 0.3% | 71 2.5% | 553 19.1% | 1,348 46.7% | 908 31.4% | 2,889 |
| 115 - 150 | 0 0.0% | 0 0.0% | 30 3.0% | 258 26.2% | 697 70.8% | 985 |
| Total by FCAT Level | 1,449 | 1,776 | 3,339 | 3,424 | 1,954 | 12,002 |
| Total Under-performing | | | | | *n* = 442 | 3.7% |
| Total Over-performing | | | | | *n* = 1,058 | 8.8% |

*Note: Green = congruent scores, white = one level above or below expected scores, yellow = lower than expected performance, blue = higher than expected performance. The top number in each box is the number of students with that score combination.*

In this cohort, we identified 347 students with lower FSA ELA scores and 442 students with lower math scores than would be expected given their CogAT® scores[9]. After combining lists, the total unduplicated number of students underperforming on either of the FSA exams is 730.

We also identified 1,026 students who scored higher than expected on the FSA in ELA, and 1,058 who scored higher than expected on the FSA in math. After combining and removing duplicates from the lists, there were a total of 1,743 students whose FSA performance on either assessment exceeded the score predicted by their prior year CogAT® score.

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[9] When Riverside Publishing scores CogAT® and the Iowa Test of Basic Skills (IBTS) simultaneously, they flag students whose IBTS scores fall in the top and bottom 10% of the range for that particular CogAT® score. FSA levels were used here in order to simplify the calculation and better illustrate the deviant scores.

## III. Differentiated Instruction

The 2018 report contains detailed information about the learning characteristics of students with specific CogAT® scores as well as instructional strategies to best meet the varying needs of these different students. Knowing these characteristics and strategies helps teachers to determine how they can be effective in supporting students to reach their highest potential. For example, students scoring in the bottom three stanines[10] have lower levels of working memory which interferes with their ability to complete more challenging work. Often, when the teacher supports their working memory, students are able to work on these more challenging tasks. This is important because when lower-ability students are not exposed to higher-order thinking, the gap between them and other students continues to widen. Teachers can support students' working memory in a number of ways. Providing a graphic organizer, chunking work down into smaller tasks, modeling the task, and forgiving components that are not the main focus of the task (i.e. spelling in an essay) are some examples.

To help teachers differentiate instruction, profile scores for each student that completed all three batteries of the CogAT® are provided to schools. Profile scores can be typed into the CogAT® online Interactive Profile Interpretation System (www.cogat.com) to receive a detailed customized report on learning characteristics and instructional recommendations for that particular student.

Information below summarizes Districtwide performance on the CogAT® by stanine and by Profile Group. Stanine scores are used here instead of profile scores for ease of illustrating tends in the data. In addition to stanine, profile scores also indicate if there is an even pattern among the three batteries, a relative strength or weakness in one area, a relative strength and weakness in two areas, or an extreme strength or weakness in one area. Thus, the large number of specific profile scores makes it difficult to graph. A summary of the distribution of scores across the groups and stanines is presented below at the district level.

### Description

All students who had an Age Stanine$_{VQN}$ score were included in this analysis. Students with an Age Stanine$_{VQN}$ of one, two, and three were assigned a Profile Group of one. Students with an Age Stanine$_{VQN}$ score of four, five, or six were assigned a Profile Group of two. Students with an Age Stanine$_{VQN}$ score of seven or eight were assigned a Profile Group of three, and students with an Age Stanine$_{VQN}$ score of 9 were assigned a Profile Group of four.

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[10] Stanine is a method of scaling test scores on a 9-point standard scale that has a mean of 5 and standard deviation of 2.

The distribution of stanine scores for 2018 and 2017 showed a similar pattern (Figure 11). In both years, the data are skewed to the left, indicating that BCPS students had scores somewhat lower than the national normative sample.  Specifically, BCPS had more students with stanine scores of three and four, and less with stanines seven and eight.  Scores for 2018 were slightly different than scores for 2017.
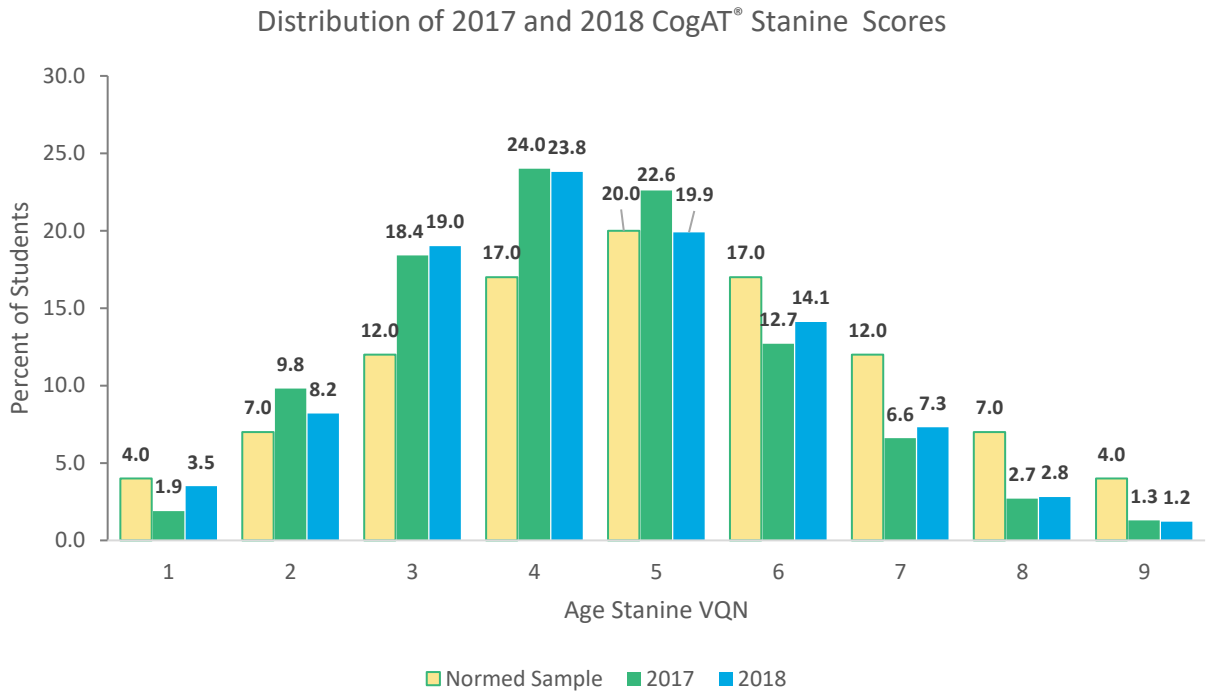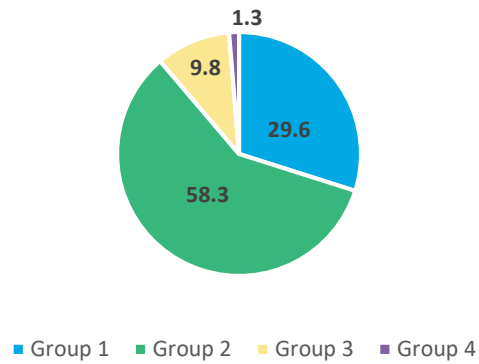
Distribution of 2017 and 2018 CogAT® Stanine  Scores



*Figure 11*. Distribution of CogAT® age stanine $_{VQN}$ scores for 2017 and 2018.

Similarly, the distribution of profile groups for BCPS showed more students in groups one and two, and less in groups three and four (see figure 12).
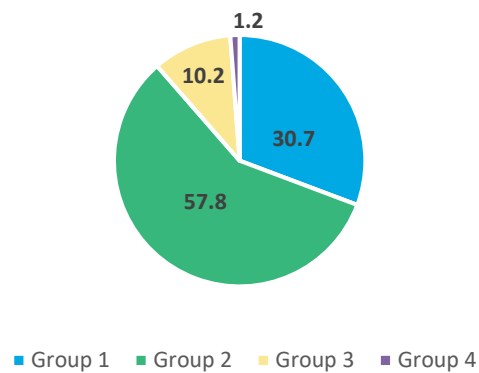
[1] Stanine is a method of scaling test scores on a 9-point standard scale that has a mean of 5 and standard deviation of 2.

## Distribution of **2017 CogAT**® Scores by Group



| ■ Group 1 | ■ Group 2 | ■ Group 3 | ■ Group 4 |

## Distribution of **2018 CogAT**® Scores by Group



| ■ Group 1 | ■ Group 2 | ■ Group 3 | ■ Group 4 |

## Distribution of National Normed Sample
**CogAT**® Scores by Group



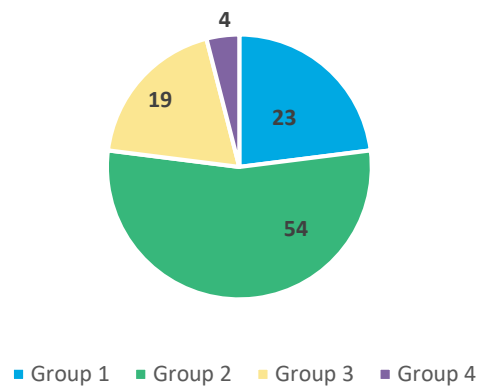| ■ Group 1 | ■ Group 2 | ■ Group 3 | ■ Group 4 |

*Figure 12*. Distribution of scores by profile group for BCPS in 2017 (top) and 2018 (middle) and for the national normed sample to which BCPS data are compared (bottom).

**Participation**

The 2018 administration of the CogAT® yielded profile scores for 13,466 (74.0% of second grade students) students. In total, 16,368 (89.9%) students attempted at least one battery of the CogAT®. Not all students attempted all three batteries, and some attempted but were not able to complete enough items to receive a score.

**Performance**

Mean scores for BCPS students on the Verbal and Quantitative batteries were somewhat lower than the national sample to which it is compared (7.6 percentage points lower for verbal and 5.3 percentage points lower for quantitative). Scores for the nonverbal battery were 2.2 percentage points lower the national sample.

**Gifted Screener**

One-hundred and forty-eight students who took all three batteries of the CogAT® met screening criteria for Plan A (1.1%). For Plan B, 1,397 students met the score criteria of the CogAT® (10.3%), with 655 also meeting the requirement of being ELL or FRL. Thirty-four students meeting Plan A criteria and 39 students meeting Plan B criteria had already been identified as gifted. In total, after accounting for duplication (some students met both Plan A and Plan B criteria), 756 students met screening criteria, 691 of which were not previously identified as gifted. The distribution of all students meeting screening criteria is 24% Black, 37% Hispanic, 22% White, 29% ELL2, and 74% FRL.

**Correlations with FSA**

The 2018 CogAT® scores were well-correlated with the 2019 FSA in both reading and math. The composite score of all batteries of the CogAT® ($SAS_{VQN}$) offered the best predictive value, having the highest correlations (.68 for 3rd grade reading and .71 for 3rd grade math).

**Deviations from Predicted Scores**

Since CogAT® scores are correlated with standardized test scores, they are a good predictor of FSA performance. Students whose CogAT® exam predicts a substantially higher score than they achieve may not have had appropriate opportunities to learn in school, may not be motivated to learn, or may have a disability that interferes with their learning. Of the students who took the CogAT® in 2018, 347 students scored lower than expected on the 3rd grade FSA ELA and 442 for math. Students whose CogAT® score predicts standardized test scores that are lower than their actual performance may be working really hard to master the material. However, they may also be learning in a contextually bound manner and not learning to transfer information they learn in class to other situations. In ELA, 1,026 students had substantially higher 2019 3rd grade FSA scores than was predicted by the CogAT®. In math, 1,058 students were in this category.

**Differentiated Instruction**

CogAT® scores provide valuable information to teachers in customizing instruction to meet the cognitive needs of students. Each elementary school is provided with their students CogAT® profile score and profile group. Each of the four groups have distinctive learning characteristics as well as instructional strategies that they benefit from. The majority of BCPS students taking the CogAT® in 2018 fell into Group Two (57.8%). Group One was the second largest group, with 30.7% of students belonging in this group. The two highest groups, Group Three (10.2%) and Group Four (1.2%) make up less than 15% of BCPS students. Nationally, 23% of students fall into the two highest categories.

<div align="center">

**DISCUSSION**

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Since the release of the initial CogAT® report in October 2015, BCPS's Student Assessment and Research department has supplied teachers and principals with tools to help differentiate instruction.

In January and February of 2016, all District-run elementary school principals attended a CogAT® workshop along with one of their third grade teachers. In this half-day workshop, they learned how to translate CogAT® scores into meaningful information about the learning characteristics of each student. They also learned teaching strategies to support students based on their learning characteristics and had the opportunity to practice differentiating lessons and strategies to teach the same standard to all students, but in a way that is well-suited to the students' individual learning needs. As part of the training, a Using CogAT® Scores to Inform Instruction guide was distributed and is included in Appendix B.

At the workshop, principals expressed interest in receiving CogAT® scores in May so they could be used to help plan classroom placement for the following year. This information was posted on the DWH Reports folder on May 9, 2016. There was also interest in a letter template that could be used to share CogAT® scores with parents. A copy of this letter is included in Appendix C.

Discrepancy scores at the student level are posted in the DWH reports folder. Schools are encouraged to take a closer look at these students to determine if they need extra support. In the case of "underachievers." a good place to start is with gauging the student's level of engagement and motivation. A relative strength on the nonverbal battery is consistent with the student having a low level of motivation. If that is not a concern, the next step is to determine if the student has had been afforded appropriate opportunities to learn at school. Finally, screening for a physical or learning disability may be appropriate. In the case of "overachievers," a relative weakness on the nonverbal battery supports the idea that the student has worked exceptionally hard to achieve a high score on the FSA. A relative weakness on the verbal or quantitative battery may be an indication that the student's instruction has not focused on transfer.

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